Accelerating the Reduction of Maternal Mortality in Developing Countries

P A P E R # 6 A P R I L 1 9 9 7

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Introduction

Most maternal and neonatal deaths are preventable. Of the estimated 585,000 deaths annually related to pregnancy, labor and delivery (World Health Organization [WHO]/ UNICEF 1996), 60 80 percent are due to five direct causes: hemorrhage (25 percent of all maternal deaths), sepsis (15 percent), hypertensive disorders of pregnancy/eclampsia (12 percent), obstructed labor (8 percent) and unsafe abortion (13 percent) (WHO 1994b). Many of the 4.3 million newborn deaths each year also are preventable, particularly those caused by birth asphyxia (21 percent of all neonatal deaths), pneumonia (19 percent), tetanus (14 percent), birth trauma (11 percent), sepsis (7 percent) and diarrhea (2 percent) (WHO 1994b). It is estimated that some 53 percent of maternal deaths and 38 percent of newborn deaths could be averted through a small number of relatively low technology interventions (WHO 1995).

Reducing the unacceptably high levels of maternal mortality that persist in many countries and bringing about the best possible outcome of every pregnancy will be major challenges for the remainder of the 1990s and into the next millennium. The Safe Motherhood Conference held in Nairobi in 1987 called for a reduction of maternal mortality by half by the year 2000 (Herz and Measham 1987). This target subsequently has been adopted by most developing countries.

Many developing countries have experienced a remarkable improvement in a number of their public health indicators during the past decade. In Indonesia, Kenya and Zimbabwe, for example, fertility is on a downward slope and contraceptive prevalence is increasing. These same countries, however, have been unable to reduce maternal mortality despite strong efforts on the part of government, professional associations, nongovernmental organizations (NGOs), technical assistance organizations and donor agencies (Central Bureau of Statistics [Indonesia] 1995; Central Statistical Office [Zimbabwe] 1995; National Council for Population and Development [Kenya] 1995). In some countries, the decline in the maternal mortality ratio has been so slight that it is nearly imperceptible (BAPPENAS and UNICEF 1994). Why is this? Why is there so much success in some areas and so little in the area of maternal mortality? This paper will explore some of the factors that contribute to this situation and then suggest an approach that might be taken to ensure a greater probability of success in reducing maternal mortality.

The maternal mortality situation can be compared to a car that needs repairs. Imagine that a person needs to drive urgently from one city to another; but the car has a flat tire, a dead battery, an engine problem and worn out shock absorbers. If the driver is experienced in tire repair, s/he can fix that quickly. But even after repairing the tire, s/he still cannot get where s/he is going.

On the other hand, if the trip is really urgent, the person may be able to drive there after some, but not all, of the other repairs are completed, because some repairs are not as critical as others. For instance, s/he can drive with worn out shock absorbers. S/he may have to go more slowly, but s/he should arrive in the end. The shock absorbers can be replaced after arriving. Other problems, however, will have to be repaired before the car will go at all, such as the tire and the battery. The important thing for the driver to know is what the problems are, and which ones have to be fixed before s/he can get started.

Maternal Mortality in Indonesia

The maternal mortality ratio (MMR) for Indonesia, 450 per 100,000 live births in 1986 (or about 20,000 deaths per year), declined very slowly in the last decade to 420 per 100,000 live births in 1995. There is wide variation in the MMR among provinces, from 130 to 750 per 100,000 live births. This figure is three to six times the MMR in other ASEAN (Association of Southeast Asian Nations) countries, and 50 times that in developed countries. Over 90 percent of maternal deaths are caused by the classic trio : hemorrhage (40 60 percent), infection/sepsis (20 30 percent) and toxemia (20 30 percent). Although data on abortion are not available, deaths from abortion are known to be high, representing between 10 and 15 percent of maternal deaths. Approximately 60 percent of pregnant women suffer from anemia. Seventy percent of births take place at home; most of these are attended only by traditional birth attendants or family members (Central Bureau of Statistics [Indonesia] 1995).

There has been a sharp decline in Indonesia s infant mortality rate from 142 infant deaths per 100,000 live births in 1968 to 57 per 100,000 in 1992. The total fertility rate also has declined steadily since the early 1970s. The 1994 level of 2.85 children per woman of childbearing age is about half the 1971 rate of 5.61 children per woman. Fertility has declined in all age groups in Indonesia. The pattern of age-specific fertility is the same as in the past, except that the peak in fertility has shifted from age 20 24 to age 25 29. The contraceptive prevalence rate (CPR) has been rising steadily since the 1980s. The CPR which was attributed to modern contraceptive methods was 48 percent in 1991 and rose to 52 percent in 1994 (Central Bureau of Statistics [Indonesia] 1995).

Reducing the high levels of maternal mortality is analogous to the situation of the car needing repairs. Numerous factors contribute to the maternal mortality situation in a country. Resolving only one or two problems will do little to reduce mortality if there are several other related problems remaining untouched. As soon as the essential problems are dealt with in a coordinated fashion, the decrease in mortality will be accelerated. After these initial essential problems are under control, steps can be taken to resolve the other ones that are having less impact on mortality. It is important from the outset, however, to know just what the problems are and which ones require immediate attention.

The purpose of this paper is to:

- describe the factors that contribute to maternal mortality,
- outline the steps that can be taken to accelerate the reduction in maternal mortality, and
- discuss the critical need for coordination of a country s effort by a safe motherhood committee.

Complex Fabric of Factors Related to High Maternal Mortality

A range of factors has contributed to the continued elevation of maternal mortality levels in certain developing countries during the past decade. These include:

- multiple government sectors
- multiple disciplines
- multiple levels of the health system
- multiple cadres of health workers
- distribution of services and personnel
- insufficient information

Multiple Government Sectors

The health sector alone cannot solve the problem of safe motherhood. Indeed, without the support of other sectors, efforts by the health sector will do very little to move maternal mortality downward. Education has been shown to correlate strongly with appropriate care-seeking in the case of maternal complications (AbouZahr and Royston 1991). Family life education classes in primary and secondary schools need to convey messages about maternal health. Improving the overall educational levels of girls is crucial. Although these are long-term solutions and will not have an impact before 1999, they still should be treated as priorities now in order to have an effect as soon as possible.

Maternal health information and education also need to be provided to adults and to youth who are out of school. In many cases this educational effort will require the cooperation of the media. The women s affairs sector of the government is probably in a better position to handle this than the health sector. It also can address other community-level issues such as problems of transport, because solutions to transport problems that come from outside the health sector have frequently proven to be more effective and sustainable than those from within. The health sector itself has its own set of challenges to which it must respond. Thus, unlike many other public health problems that can be attacked from a health perspective alone, safe motherhood requires solutions from multiple sectors.

Efforts of all these sectors must be coordinated in order to have the desired effect. For instance, if a community is informed and educated about maternal complications, but the transport problem is not resolved, mothers will continue to die unnecessarily. If transport is available and affordable, but health services

Safe Motherhood Program in Indonesia

In 1993, the Government of Indonesia developed Broad State Guidelines with the ultimate goal of improving the health status of the community and the quality of human life. The maternal health program set targets for maternal and perinatal mortality and a number of related components of maternal care. This program aims to reduce the maternal mortality ratio from 420 to 225 per 100,000 live births by 1998 1999; improve access to and coverage of prenatal care, attended delivery, and tetanus toxoid; and reduce iron deficiency anemia.

The policy to support the safe motherhood initiative encompasses ten strategies (MacDonald 1997):

1. Increase leadership awareness of and commitment to safe motherhood.
2. Improve the quality of information on maternal mortality and morbidity.
3. Establish a sound technological basis for safe motherhood through use of appropriate and effective technologies.
4. Improve maternal healthcare services, including nutrition and family planning.
5. Strengthen the availability, skills and technical capability of human resources.
6. Improve management and supervision.
7. Intensify information, education and communication (IEC) efforts.
8. Develop community-based interventions which support women, especially during pregnancy and childbirth.
9. Further enhance the status of women.
10. Promote and carry out research to develop appropriate interventions to support the safe motherhood initiative.

have not been strengthened to handle obstetric complications, not only will maternal deaths continue to occur, but communities will become disillusioned with their health services. This disillusionment represents yet another obstacle which will have to be overcome in the future (Thaddeus and Maine 1990).

Multiple Disciplines

Reducing maternal mortality therefore requires an effort from dedicated, competent people from many disciplines. Skilled, properly trained healthcare providers are absolutely necessary to achieve results, but strengthening this group alone is not sufficient to have a significant impact. Skilled trainers (both clinical and nonclinical), communicators, managers, operations researchers and many others are also needed, in addition to supplies, equipment, facilities and financial resources.

Multiple Levels of the Health System

The majority of problems contributing to mothers dying do not lie at a single level within the health system. There are problems at the level of the family, the community, the health center, the district hospital, the district health system and the provincial administration. Families may not know the early signs of obstetric complications. They also may not know where the best source of care is, and if they do, they may not be able to afford to get there and use it. Cultural factors may influence the family s decision to seek care, but once they have decided, they need access to affordable transport.

At the community level, a midwife or auxiliary midwife may be available with at least some of the skills needed to prevent maternal deaths. In societies that prefer untrained traditional birth attendants (TBAs) or no birth attendant at all, however, the midwife may not be called to deliveries to use her skills in a timely fashion. In addition, not every health center has the equipment or the trained personnel it needs to treat maternal complications. Hospitals, because of heavy caseloads and poor triage, may not treat a woman who arrives with a complication in time to save her life. If they do, the unavailability of blood, drugs or anesthesia may prevent staff from taking the action they know is needed to save her. Supply chains, supervisory pathways and management at the provincial level may also need strengthening to ensure that the more peripheral levels of the system function adequately.

Multiple Cadres of Health Workers

Within the health sector, nearly every cadre of health worker is involved in the challenge to reduce maternal mortality. Obstetrician-gynecologists, generalist physicians, midwives, nurses, auxiliaries and TBAs are all involved. That TBAs need to be a part of the strategy is generally agreed upon (Budiharsana-Iskandar and Hull 1996), but the definition of their role is a bit more problematic. Surely TBAs can conduct a clean, safe delivery and identify complications at an early stage. This may help get women on route earlier to obtain care. But how much formal training they should receive, and how they should be supervised and integrated into the conventional health system, remain unanswered questions.

In some countries (e.g., Indonesia), village midwives have already been trained and posted to villages. To become effective maternal healthcare givers, however, they need some additional training. They also need to be present at, or at least immediately after, deliveries if they are to be instrumental in preventing deaths from postpartum hemorrhage, which may amount to 30 40 percent of all maternal deaths. Recent data show that many deaths from postpartum hemorrhage

take place during the first 4 hours after delivery (Li et al 1996). If present at the delivery, the village midwife could practice active management of the third stage of labor, including the use of oxytocin after the delivery of the anterior shoulder, as a means of preventing cases of postpartum hemorrhage. Village midwives not being involved with the birthing process, however, remains as much a sociocultural as a health services problem.

Personnel at health centers are a great untapped resource in preventing maternal deaths. Common belief has long held that if a woman experienced a complication during labor, delivery or in the immediate postpartum period, the only place she could obtain care was at the hospital. But a WHO technical working group in July 1993 (WHO 1994a) and the JHPIEGO workshop on Issues in Training for Essential Maternal Health Care in April 1996 (Johnson and Lewison 1997) confirmed that much can be done at the health center level to treat maternal complications. These interventions include forceps delivery or vacuum extraction; parenteral antibiotics for infection; diazepam for eclampsia; oxytocin and manual removal of the placenta for hemorrhage; and manual vacuum aspiration for incomplete abortion. Even when definitive treatment cannot be provided at the health center, patients can be stabilized for onward transport to the hospital. In addition, health center personnel are in a position to prevent maternal deaths through the use of the partograph to monitor labor and the active management of the third stage of labor. These personnel, however, may have to be trained or retrained in these skills, given the proper authority to practice them and provided with the necessary supplies and equipment.

Physicians, of course, are also part of the process of making motherhood safer. Doctors at the district hospital level should be able to perform caesarean sections, operate on ectopic pregnancies and repair uterine tears. Those who cannot need refresher training. But it is not enough for just one doctor at every district hospital to be able to do emergency obstetric surgery. One doctor cannot be available 24 hours a day, 365 days a year, yet obstetric emergencies can occur at any moment. Therefore the surgeon and/or general practitioners at the hospital should also be trained so that 24-hour coverage can be ensured. To be fully prepared for an emergency at any time, a hospital should have at least three physicians who can perform emergency obstetric surgery.

There are two main reasons that tertiary level obstetrician-gynecologists have one of the smaller parts to play in the crusade to prevent mothers from dying. First, most maternal deaths occur before the woman reaches a level staffed by one of these specialists (Budiharsana-Iskandar and Hull 1996). Second, most of the conditions that lead to maternal deaths can be adequately treated by other cadres of health worker at more peripheral levels. Specialists do have an important role to play, however, in setting standards at all levels and in training general physicians in the obstetric surgical skills they need. They can organize these activities through their hospitals or professional associations.

Distribution of Services and Personnel

The distribution of other types of healthcare providers is not always proportionate to the needs of the population they serve. Likewise, service delivery points may not be distributed equitably. In most countries, more providers and service points are concentrated in urban than in rural areas. This distribution is particularly critical for maternal complications, because untreated, they can progress

rapidly to death, especially in the case of hemorrhage, as noted above. The urban-rural disparity can be seen in the case-fatality rates of many countries, where the probability of dying of hemorrhage, for instance, is higher the farther a woman lives from a source of definitive care. In general, the maternal mortality ratio is lower in urban than in rural areas (AbouZahr and Royston 1991). These disparities will have to be addressed before a country can reduce maternal mortality by half. Unfortunately, governments often do not know where in the rural areas the problem is greatest, where extra personnel should be deployed or where new health centers or hospitals should be built. A geographical information system (GIS) could be useful in solving these problems and could be a part of the development of an overall maternal health strategy.

Insufficient Information

Not enough is known about some parts of the maternal health problem to make rational decisions. There are reliable data, for example, showing that more deaths occur postpartum than antepartum, and that most postpartum deaths occur in the first week after delivery, many during the first 4 hours most of these as a result of hemorrhage or eclampsia (Li et al 1996). Clearly, any cost-effective safe motherhood strategy will have to address the prevention of these deaths as a priority. But where, when and under what circumstances are women dying at other times during pregnancy, and how can they receive services in a timely manner? More operations research will be needed to answer these questions.

In summary, instituting a package of interventions that does not take into consideration the essential issues, levels, disciplines, sectors and cadres involved will not be effective in reducing maternal mortality by half by the year 2000. Not every issue needs to be addressed immediately, but the present situation needs to be well understood and rational decisions have to be made to deal with the most critical problems. This approach will result in the most favorable results for the investment.

Steps in the Process of Accelerating Reduction in Maternal Mortality

There is no question that the situation with regard to maternal mortality is indeed complex. Nevertheless, there is an urgent need to undertake interventions as quickly as possible to begin to reduce the unacceptable toll of maternal deaths. The use of a step-wise process, modified from WHO s plan (WHO 1994b), is recommended to judge the situation, develop a plan and institute effective actions.

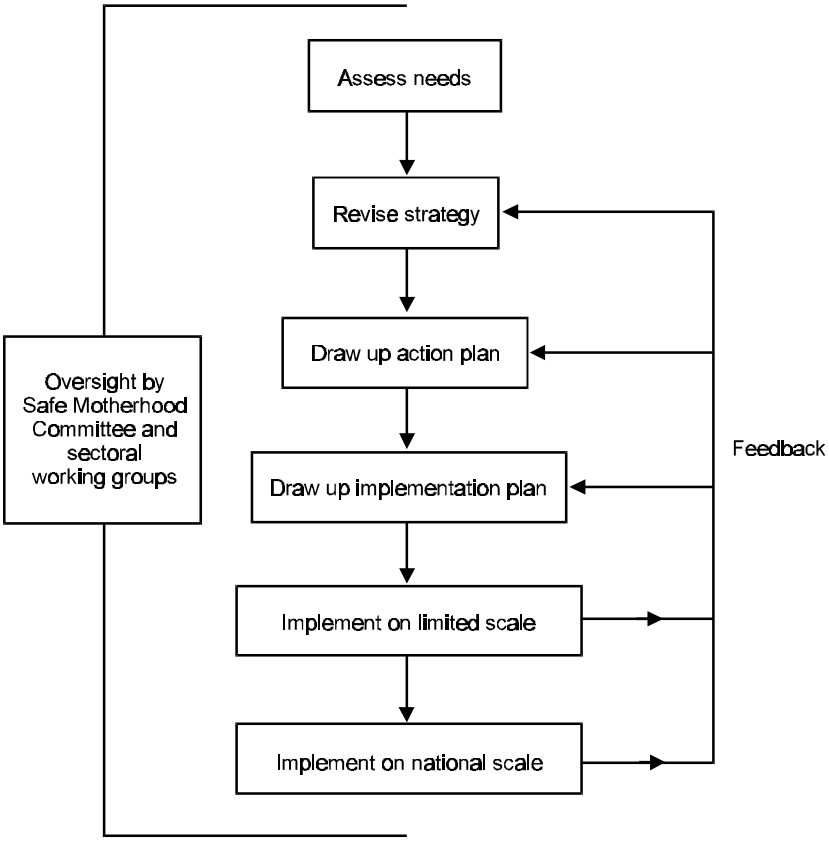
Needs Assessment

As in any major initiative, particularly one as complex as safe motherhood, a needs assessment is the necessary starting point. If one has already been conducted, the information may need to be reviewed and reanalyzed. The review of available information will undoubtedly uncover a certain number of information gaps. Once these gaps are identified and the necessary data collected to fill them, a clear picture of the maternal mortality situation will emerge. All of this can be done quickly by a small team of people. As part of the needs assessment process, this team can then continue to refine the safe motherhood strategy (see below) and develop a national resource document on maternal health based on the strategy.

Strategy Revision

Based on the current situation and an analysis of the newly available data, a new maternal healthcare strategy is developed or the earlier safe motherhood

Figure 1 Steps in the Process of Accelerating Reduction in Maternal Mortality



strategy refined. This strategy should include all sectors that need to be involved to ensure reduction of maternal and neonatal mortality. It must identify an approach that will draw on the strengths and resources of each concerned partner: Ministries of Health, Population, Education, Women s Affairs and others; professional associations; NGOs; technical assistance organizations; and donor agencies. It must also identify approaches that can give results most rapidly and those that can produce maximum results with the available resources.

Action Plan

An action plan consistent with the new strategy can then be drawn up. This plan should build on the current actions and progress of all the partners to date. It will identify the principal activities that must be undertaken to achieve the overall objectives. The action plan should be comprehensive. It should identify the actions to be taken in strengthening the district health services infrastructure; conveying IEC messages to the public; mobilizing community groups; addressing managerial weaknesses and problems related to financing; training all of the stakeholders as necessary (both clinical and non-clinical); and defining operations research questions. Because the campaign to reduce maternal mortality is a large one and financing will come from many sources, the action plan should identify the principal funders and the parts of the plan that each donor will support. Also to be addressed in the action plan is the scheme for coordination of all of the participating Ministries and

agencies. This is particularly crucial in the area of safe motherhood, where many agencies and organizations are involved and the achievement of one organization s objectives is critical to the success of another s. Finally, the scheme for monitoring and evaluating the activities should be outlined in the action plan.

Implementation Plan

Often in planning an intervention strategy, it is expected that activities will be initiated when the action plan has been completed and funding secured. In fact, this frequently does not happen. One reason is that the action plan has not been developed to a sufficient level of detail. In large and complex initiatives, an implementation plan or work plan is also needed that provides a specific blueprint for how activities will be undertaken. This plan, which may be prepared or revised on a year-to-year basis, gives additional detail for every activity proposed in the action plan. For each activity, it identifies what agency will be responsible; if possible, the individual in the agency who will take charge of it; where it will be undertaken; who the beneficiaries will be; when it will happen; and how it will be funded. Every sector must be able to identify its own role in the implementation plan, must know how that role links with the roles of other sectors and must ensure coordination with the other players.

Initiation of Implementation with Close Monitoring

The implementation itself, as outlined in the implementation plan, will probably begin in a limited number of districts in a country. Although the ultimate goal is to have a nationwide initiative serving every corner of the country, it is prudent to begin in a select number of sites first. As will have been specified in the implementation plan, activities and outcomes at these initial sites are continually and closely monitored and periodically evaluated. Ideally the sites selected for initial startup should be generally representative of the whole country; there should be isolated and non-isolated ones, urban and rural ones, wealthy and poor ones, etc. Even more important, however, is the ability to get valid feedback from each initial site, because the success of subsequent steps depends on this information.

Based on this monitoring and evaluation feedback, the overall plan is refined and adjusted. It may be discovered that some activities cannot be implemented. Also, some activities that have been completed may be found to have an unexpected result and need to be revised. Other activities may turn out to be superfluous and can be eliminated. Some activities that had not been included may be determined to be necessary and should be added to the action plan.

This stage of initial implementation has to be accomplished in a very short period, because the plan will need to be revised before it is expanded to the national scale. Safe motherhood is a pressing need. It does not allow for the creation of pilot projects that run for 3 to 5 years and then are fully evaluated before recommendations are made for expansion. Startup activities in initial districts could roll out under close monitoring for about 1 year. At the end of that time, enough will be known about starting up so that this part of the plan can be revised. Implementation can then begin, in a phased fashion, in other areas of the country. During the second and subsequent years, the initial districts will continue to be monitored and the lessons learned there can be transferred to the new districts in due course.

Continuation until National Scale is Reached

During this second stage of implementation, the initiative is brought to national scale using a phased approach. New districts are added in a systematic fashion. Also during this stage, districts that began the process earlier and have experienced success can be used as resources for districts that are just starting the process. For instance, a training site in one of the earlier districts may be able to accommodate trainees from another district and even train their trainers before the second district has been able to set up its own training facilities. This will mean that the expansion will accelerate progressively as the initiative proceeds, and that districts that start up later will get up to speed faster than the ones that started first.

Need for Coordination

Safe Motherhood Committee

Because multiple partners are involved and their inputs need to be coordinated, a high-level, national safe motherhood committee or its equivalent is imperative. Through information exchange and a collegial approach to coordination, this committee steers the initiative through its planning and implementation stages. This committee could include, but not be limited to, the Ministries of Health, Population, Education and Women s Affairs; professional organizations; NGOs; technical assistance agencies; and donor agencies. It would be a large committee if all the stakeholders are represented. It cannot enter into too much detail, but it could oversee the general process of planning and implementation. Members of this committee should be leaders and decision-makers, with the ability in their respective organizations to influence the direction of the initiative and to ensure that planned activities are indeed accomplished.

Sectoral Working Groups

Within this large committee, or attached to it, smaller working groups or action groups ensure that the process continues to move along within each sector. In the health sector, for example, the Ministry of Health at several levels, the national family planning association, the professional associations of obstetricians and gynecologists and of midwives, technical assistance agencies, development banks, and bilateral and international aid agencies might all be in the group to coordinate the health-related activities. A similar group might be set up by the Ministry of Women s Affairs to coordinate safe motherhood activities at the community level. These working groups are the mechanism for revising the implementation plan. They also oversee the development of guidelines, informational materials, training materials, etc., related to the sector.

Conclusion

Just as a car can be repaired, programs to reduce maternal mortality can be strengthened. It will require the input of many players, a realistic analysis of the present situation, careful planning, dynamic implementation, a phased approach and, most of all, the willingness of all partners to collaborate in this herculean effort. This paper has identified some of the factors that are contributing to high levels of maternal mortality, all of which will have to be taken into consideration in evolving a strategy. It recommends a systematic approach that can be successful in dealing with the challenge of safe motherhood and accelerating the reduction of maternal mortality.

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Educational and raining Materials

Reference Manuals[1]

Clinical Training Skills for Reproductive Health Professionals (1995)

Infection Prevention for Family Planning Service Programs (1992)

IUD Guidelines for Family Planning Service Programs, 2nd ed. (1993)

Norplant® Implants Guidelines for Family Planning Service Programs, 2nd ed. (1995)

Postabortion Care: A Reference Manual for Improving the Quality of Care (published by the Postabortion Care Consortium 1995)

Service Provision Guidelines

PocketGuide for Family Planning Service Providers, 2nd ed. (1996)

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Postabortion Care: A Global Health Issue (produced by the Postabortion Care Consortium 1994)

Postabortion Care Services: Use of Manual Vacuum Aspiration and Recommended Practices for Processing MVA Instruments (1996)

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[1] A training package consists of a reference manual, notebook for trainers and handbook for participants. Most packages are available in French and Spanish, and many are available in Portuguese and Russian as well. For videotapes, English scripts are available to permit voice-overs in other languages.

Workshop Proceedings

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